

AI721 KNOWLEDGE REPRESENTATION AND REASONING

Introduction: The key concepts: Knowledge, Representation and Reasoning, Why Knowledge Representation and Reasoning?, The Role of Logic.

The Language of First Order Logic, Expressing Knowledge.

Resolution: The Propositional Case, Handling Variables and Quantifier, Dealing with Computational Intractability.

Reasoning with Horn Clauses: Horn Clauses, SLD Resolution, Computing SLD Derivations.

Procedural Control of Reasoning: Facts and Rule, Rule Formation and Search Strategy, Algorithm Design, Specifying Goal Order, Committing to Proof Methods, Controlling Backtracking, Negation as Failure.

Rule in Production system, Object Oriented Representation.

Structural Descriptions: Meaning and Entailment, Computing Entailment, Taxonomies and Classification.

Inheritance: Inheritance Networks, Strategies for Defeasible Inheritance, A Formal Account of Inheritance Reasoning.

Defaults: Closed-World Reasoning, Circumscription, Default Logic, Autoepistemic Logic.

Vagueness, Uncertainty, and Degree of Belief: Noncategorical reasoning, Objective Probability, Subjective Probability, Vagueness.

Actions: The Situation Calculus, Complex Actions.

Planning: Planning in the Situation calculus, The STRIPS Representation, Planning as a Reasoning Task.